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Attitudes to North Queensland road use: do hospitalised drivers/riders appear different by comparison to those not involved in crashes?

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Abstract

In rural and remote Australia, per capita risk of death or injury from a vehicle crash is substantially higher than that for urban areas. Historically this has always been so, and a paucity of prior research in this area inspired the Rural and Remote Road Safety Study, goals of which include assessing and developing interventions to reduce the incidence and associated costs of crashes outside cities. With three years of rural and remote crash data collection completed, findings indicate driver behaviour contributes to most crashes, and is the sole cause in a large proportion of these.

Over 380 patients admitted to a major North Queensland hospital for at least 24 hours following a vehicle crash consented to an interview in which a structured questionnaire was administered. This paper reports on responses to questions regarding seatbelt and helmet use, speeding, alcohol consumption and self-reported drink driving. We also analyse desired changes in enforcement of road laws, and perceived effectiveness of specific interventions. Seeking to further identify potential links between behaviour, attitude and crash involvement, the study compares responses of hospitalised patients with those of other road users in specific crash vicinities. Results suggest that rural road users hospitalised after a crash are more likely to binge-drink, drink drive and disregard road rules, and are less likely to wear seatbelts than those not involved in crashes. Development of more effective interventions targeting attitude and behaviour is essential if crashes and their impacts are to be significantly reduced in rural and remote Australia.

Introduction

The Rural and Remote Road Safety Study (RRRSS) was designed and implemented collaboratively by CARRS-Q (Centre for Accident Research and Road Safety - Queensland) at Queensland University of Technology and the Rural Health Research Unit at James Cook University. A five-year multi-component project, the Study constitutes a direct response to the disproportionately high risk and costs of rural road use, recognised in prior research and highlighted in the *National Road Safety Strategy 1992-2000* (Australian Transport Council, 1992), and the *Commonwealth Rural Road Safety Action Plan (1996)* (Australian Transport Council, 2000). Risk of transport-related death or injury in rural and remote areas is up to six times higher than that on metropolitan roadways. The associated medical, social and economic costs are a

major concern for affected communities and government (CARRS-Q, 2005, Tziotis et al., 2005, Veitch et al., 2005).

Previous research has demonstrated that the frequency and severity of crashes in rural and remote areas is influenced by numerous behavioural factors, including speed, alcohol and drug use, seatbelt use, fatigue, and inexperience with vehicle types and driving environments, among others (Evans, 2004, Veitch et al., 2007, Tziotis et al., 2005). While these factors are found also to contribute substantially to urban road trauma, there is a paucity of research to date specifically examining their role and influence in rural and remote Australia (Veitch et al., 2005). The primary aim of the RRRSS is thus to increase knowledge regarding crashes in rural and remote settings, with a view to informing future policy and development of appropriate interventions.

The Study area covers roughly 800,000 km² of North Queensland, north and west of Bowen to the Torres Strait and Northern Territory border respectively (Townsville and Cairns urban areas are excluded due to the rural focus of the Study). It covers extensive road networks of various surface type and condition across a range of natural environments, including tropical savannah, montane rainforest, coastal dune and mangrove, and arid inland areas. Resident population in 2001 was approximately 455,000 at an average density of 0.7 persons per km² (mostly concentrated along the east coast south of Port Douglas). Detailed demographic and background information is available in the RRRSS baseline report, *Rural and remote road safety research project: five year crash and area profile of North Queensland* (CARRS-Q, 2005).

This paper considers levels of agreement/disagreement between two respondent groups' self-reported attitudes and behaviours associated with their use of motor vehicles. The data was gathered in post-crash interviews with injured motorists and in interviews with a comparison group of uninjured road users in known crash vicinities. We build on a previous paper which reported on preliminary results of interviews with the injured motorists, but not the comparison group (Veitch et al., 2007). The current analysis supports the earlier findings, and also considers which particular responses regarding attitude and behaviour feature more strongly in one group or another.

Methods

Following ethics approval from the University partners, Queensland Health, Queensland Ambulance and Queensland Police Service, RRRSS data collection began in March 2004, concluding at the end of June 2007. Study criteria sought crashes in North Queensland which resulted in a hospitalisation for 24 hours or more at one of four major hospitals (Atherton, Cairns, Townsville or Mount Isa), or a fatality. Following medical clearance, patients aged 16 years or over who were hospitalised after a crash were approached for consent to an interview with research

staff (interviews were not sought with anyone injured in fatal crashes). A structured questionnaire was then administered to consenting participants to obtain information on their crash experience, general driving experience, attitudes and behaviours, alcohol and drug use and demographic characteristics. The study focuses on drivers and riders (controllers) of motorised vehicles only; cyclists, pedestrians and passengers have been excluded.

Central to the RRRSS aim of better understanding behavioural factors in crashes are analyses of two key data sets mentioned above: interviews with patients hospitalised after crashes, and interviews with a comparison group of road users (not involved in crashes) in specific crash vicinities, hereafter called the 'hospital' and 'roadside' groups respectively. Essentially the same questionnaire was administered to each group, though the roadside group received a shortened version from which inapplicable and least useful questions were removed. All questions relating to this analysis were retained for the roadside group exactly as they appeared in hospital questionnaires. Data from each group were combined within a single SPSS database for the purpose of frequency analysis, crosstabulation and non-parametric testing for statistical significance (p -value < .05, following Veitch et al. (2007)). Discussion of some results also considers other RRRSS sources, such as Queensland Transport's WebCrash2 database for crash cause attributions, and an earlier analysis of themes identified in patient narratives (Blackman et al., 2006).

Results

Age and gender

The difference between the hospital and roadside groups on gender was statistically significant, though in both groups the majority of participants was male (Table 1). The hospital group of 307 participants had an age range of 16 to 86 and a mean age of 38 years, while 658 respondents in the roadside group had a mean age of 47, with a range of 17 to 90 years. The distribution of age groups also differs significantly between the two groups, with 48.8% of hospital respondents below 35 years of age, compared to 20.6% in the roadside group (Table 2).

Table 1: Gender distribution by group

Group	n	Male		Female	
		%	n	%	n
Hospital	307	82.4	253	17.6	54
Roadside	658	69.0	454	31.0	204
Sig.		.000			

Table 2: Age distribution by group

		Recoded age into 9-year groups							Mean age	SD
		16-24	25-34	35-44	45-54	55-64	65-74	75 >		
Hospital	n	75	75	61	43	38	6	9	37.88	15.5
	%	24.4	24.4	19.9	14.0	12.3	2.0	3.0		

Roadside	n	45	91	146	175	122	55	24	46.97	14.6
	%	6.8	13.8	22.1	26.4	18.5	8.3	3.6		

Illegal behaviours

Respondents in the two groups were equally likely to have been booked for speeding at least once in the last five years, with around 75% of all respondents admitting to a speeding offence (Table 3). By contrast, statistically significant differences between the two groups appeared in relation to some other offences. The hospital group was significantly more likely than the roadside group to have committed an unspecified traffic offence in the last five years. The hospital group was also more likely to have had their license suspended, and to have been booked for drink driving in the last five years, as well as to have engaged in drink driving or to have been a passenger of a drink driver in the last month. The hospital group was somewhat more likely to have been booked for unlicensed driving, but the difference between the two groups was not statistically significant (Table 3).

Table 3: Illegal behaviours

Offence/illegal behaviour	Hospital		Roadside		Sig.
	%	n	%	n	
Speeding offence last 5 years	75.7	128	76.5	65	.879
DD offence last 5 years	18.3	31	4.7	4	.005
Unlicensed offence last 5 years	10.7	18	3.5	3	.081
Licence suspended last 5 years	18.1	54	7.1	45	.000
Other offence in last 5 years	56.1	169	42.0	86	.002
Drink drove in last month	20.3	61	11.6	24	.013
Passenger of DD in last month	19.1	57	11.6	24	.023

There are notable differences in rates of helmet and seatbelt use between the two groups (Table 4). All but one motorcycle crash where a helmet was not worn occurred on private property, and any comparison with the roadside group on this variable is thus invalid. Relatively high rates of seatbelt use were observed for the roadside group and this is perhaps influenced by the voluntary recruitment and self-reporting processes.

Table 4: Non-use of seatbelt/helmet

	No Seatbelt		No Helmet	
	%	n	%	n
Hospital	15.5	18	15.9	28
Roadside	1.5	9	-	-

Table 5 reveals statistically significant differences between hospital and roadside groups on levels of agreement for four out of eight statements regarding illegal driving behaviours. Hospital

respondents were significantly more likely than those from the roadside group to exceed speed limits if they knew (or believed) they would not be caught, and were also more likely to ignore lower limits in small towns and for roadworks. A significantly higher proportion of this group also believed that police spend too much time hassling drink drivers, and that it is OK to drive after drinking (quantity not defined in questionnaire) so long as you are not drunk. Differences between the two groups were not statistically significant for the remaining four statements: the vast majority of both groups agreed that driving to the conditions is more important than staying on or under the speed limit, and that drink drivers should lose their licence, while a large minority in both groups agreed that drink drivers should go to jail, and that stricter drink driving laws are needed in the area in which they live.

Table 5: Proportion of respondents agreeing with statements on speeding and drink driving

Statement	Hospital		Roadside		Sig.
	%	n	%	n	
I would exceed speed limits more if I knew I would not get caught	40.0	120	29.8	50	.001
I often ignore lower limits in small towns and for roadworks	16.8	50	9.5	16	.016
Driving to conditions more important than staying on/under limit	83.2	247	75.6	127	.898
Drink-drivers should lose their licence	87.8	261	87.5	146	.881
Drink-drivers should go to jail	40.6	121	44.4	74	.595
Police spend too much time hassling drink-drivers	10.7	32	7.2	12	.018
It's OK to drive after drinking if you're not drunk	25.3	75	19.2	32	.001
My area needs stricter drink-driving laws	34.9	103	40.4	67	.658

Desired change in penalties and enforcement

There is no statistically significant difference between the two groups regarding desired change in traffic-related penalties and enforcement (Table 6). For unspecified traffic laws and drink driving laws there appears to be slightly greater uncertainty among hospital respondents as to whether or not penalties should change. The strongest agreement between the two groups is seen in relation to desired changes in speed limit enforcement. There was strong support for increased drink driving enforcement and little support for decreased enforcement within both groups, though uncertainty on drink driving was slightly higher in the hospital sample.

Table 6: Desired change in penalties and enforcement

Enforcement/penalty	Group	Decrease		No Change		Increase		Don't know		Sig.
		%	n	%	n	%	n	%	n	
Breaking road rules	Hospital	9.6	29	42.9	129	30.9	93	15.9	48	.066
	Roadside	10.2	17	50.0	83	30.1	50	9.6	16	
Speeding	Hospital	13.1	39	35.9	107	36.9	110	14.1	42	.926
	Roadside	16.2	27	37.7	63	32.9	55	13.2	22	
Drink driving	Hospital	1.7	5	27.4	82	59.2	177	11.7	35	.184
	Roadside	1.2	2	28.0	47	66.7	112	4.2	7	

Perceived effectiveness of specific interventions

With the exception of speed cameras and fines for (unspecified) traffic offences, the interventions included in questionnaires were seen as 'effective' or 'very effective' by a majority of respondents in both groups (Table 7). When compared with the hospital group, a slightly higher proportion of the roadside group thought restrictions for young and novice drivers were effective, though the difference was not statistically significant. Evidently this is not due to bias produced by a disproportionately high number of young road users hospitalised; there is relatively weak support for this intervention in all age groups up to 40 years in the hospital group. As found by Veitch et al (2007), environment-related interventions ranked highly overall, while enforcement-related interventions were seen as least effective for improving road safety. Respondents in both groups considered 'courtesy buses from pubs and clubs', a community service intervention, to be more effective than any other single measure. Improved mobile phone range, while not a preventative measure in terms of hazard reduction, was thought effective by both groups, but significantly more so by hospital respondents who rated it second highest for intervention effectiveness. In addition, statistically significant differences between the two groups were observed for perceived effectiveness of roadside rest facilities*, random breath testing, special programs for heavy vehicle and fleet drivers, and policing riding in the back of utilities.

Table 7: Respondents rating interventions 'effective' or 'very effective'

Intervention	Hospital		Roadside		Sig.	% both groups
	%	n	%	n		
Courtesy buses from pubs and clubs	89.7	261	85.0	141	.896	87.3
Over-taking lanes	85.4	251	81.9	136	.323	83.6
Identifying road hazards	82.6	242	80.1	133	.506	81.3
Better roads	82.9	243	77.1	128	.424	80.0
Roadside rest facilities*	78.2	230	78.2	129	.038	78.2
Loss of licence for serious offences	78.7	232	77.6	128	.683	78.1
Road-based fatigue initiatives	75.2	221	78.8	115	.100	77.0
Improved mobile phone range	86.6	223	65.1	108	.027	75.8
Random breath testing	69.8	206	73.5	122	.043	71.6
Driver education	68.8	202	69.7	115	.741	69.2
Special programs for serious offenders	65.3	192	62.5	102	.997	63.9
Programs for truck & fleet drivers	67.3	195	59.0	98	.044	63.1
Public education programs	62.8	184	63.2	105	.908	63.0
Policing riding in the back of utes	67.0	195	56.0	93	.024	61.5
Loss of points for traffic offences	57.6	170	59.5	97	.329	58.5
Random checks for roadworthiness	55.1	162	56.0	93	.673	55.5
Restrictions for 'L' and 'P' drivers	51.0	151	59.4	48	.095	55.2
Policing overloading in cars	57.4	167	52.4	87	.051	54.9
Speed cameras	46.1	136	51.5	85	.761	48.8
Fines for traffic offences	46.1	136	44.5	73	.598	45.3

* Although identical proportions (78.2%) of each group rated this intervention effective or very effective, a statistically significant difference is observed through crosstabulation of all 5 possible responses ('very effective', 'effective', 'satisfactory', 'not very effective', or 'not effective at all').

Alcohol consumption

It is clear that respondents in the hospital group are significantly more likely to be at least occasional if not regular or frequent heavy drinkers, defined here as more than 6 drinks on one occasion, generally in line with other studies (Bush et al., 1998). Crosstabulation shows that almost 24% of all hospital respondents drink seven or more standard drinks per session at least weekly, if not daily, compared to 14% of roadside participants (Table 8). Significantly higher levels of alcohol consumption are found among males than among females in each group.

Table 8: Frequency of binge drinking

How often have more than six drinks on one occasion?	Gender	Hospital		Roadside		Sig.
		%	n	%	n	
Weekly, daily or almost daily	Male	27.3	68	18.0	77	.000
	Female	7.4	4	4.8	9	.000
	Total	23.8	72	14.0	86	.000

Discussion

The predominance of males in both the hospital (82%) and roadside (69%) groups appears to reflect both the disproportionate risk-taking and greater general exposure to risk of that gender (Evans, 2004). While general exposure data is not available for our study area, it is reasonable to assume from other Australian research that males spend more time driving and travel further, on average, than do females in North Queensland (Senserrick et al., 2003, Leal et al., 2006, CARRS-Q, 2004). That neither group represent random samples may also produce some further bias in terms of gender and age distributions (one gender or age group may be more willing to participate than another), though this has not yet been sufficiently explored. Veitch et al. (2007) observed previously that the median age of 35 years in the hospital group approximated that for the North Queensland population (36). This observation holds, more or less, for the current analysis, while comparison between groups reveals the roadside group to be considerably older on average at 47 years.

Other studies on driver attitude, behaviour and risk have recognised socially desirable responding as a limitation and have attempted to control for this potential threat to research validity (Schell et al., 2006). Without employing any controlling instrument, the current authors acknowledge the likelihood of some socially desirable responses but assert that such will generally result in underestimations rather than exaggerations of the differential between the two groups. Results of the comparison between groups may thus be viewed as conservative, although numerous uninhibited responses in the hospital group are seemingly uninformed by any sense of social desirability, other than perhaps honesty. As such, it is worth considering possible exceptions to the postulated rule of underestimated differences. For example, while around 75% of each group have been booked for speeding in the last five years, a significantly greater proportion of the hospital

group conceded that they are willing to speed under certain circumstances. Thus the roadside group, just as likely to speed as their hospital counterparts if measured on a detected offence in the last five years, may be offering socially desirable responses in relation to their stated (relatively low) willingness to speed.

There is a high level of agreement between the two groups on desired changes in speeding penalties and enforcement, with only about one-third in each group desiring an increase. Similarly, the groups agreed that 'speed cameras' are one of the two least effective of twenty listed road safety interventions, the other being 'fines for traffic offences'.

Different rates of seatbelt and helmet use between groups may be attributable in part to some bias in the hospital sample, but are likely also a feature of that sample to some extent: numerous studies have shown that failure to wear seatbelts substantially increases risk and severity of injury in crashes (Evans, 2004). Results for helmet use in Table 4 are skewed by a disproportionate number of private property crashes in the hospital sample, these crashes occurring in an environment where helmet use is unenforceable and known to be relatively low from previous studies (Fragar et al., 2005, Lower et al., 2005, Shepherd et al., 2006).

Respondents' overall rating of road safety interventions (Table 7) may reflect findings of an earlier analysis of themes within patient crash narratives, where external (mostly environmental) rather than behavioural factors were most frequently mentioned as contributing to crashes (Blackman et al., 2006). For both groups, infrastructure and service improvements are generally deemed more effective than policing and enforcement measures. The current findings are also consistent with Veitch et al. (2007), where 'of the four interventions believed to be most effective...three were related to road environment issues and one was a community service intervention'.

As previously discussed, it is thought that questions around excessive drinking will have elicited at least some socially desirable responses, so results concerning alcohol use may be underestimations and should be treated with caution. However, as they stand the results reiterate again the previously well demonstrated links between alcohol, road use and serious injury: those who drink heavily, mostly males, are overrepresented in road casualty statistics (Laurence et al., 1988, Ferguson et al., 1999, Evans, 2004). Moreover, those who drink drive or travel with drunk drivers are more likely to be hospitalised or killed in a crash.

Conclusion

Comparative analysis of the hospital and roadside groups supports an earlier study by Veitch et al. (2007) of a subgroup of the rural population with inappropriate behavioural tendencies and

attitudes toward road use. In comparison to the roadside group, members of the hospital group are more likely to binge-drink, drive after drinking, and disregard speed limits and other road rules. With regard to speeding in particular, this observation based on self-reported behaviours remains uncertain given that equal proportions of each group admitted having been booked for speeding in the last five years, while their stated willingness to speed differed significantly. The hospital group were also significantly more likely to have been booked for an unspecified offence, as well as to not wear seatbelts, clearly indicating that they are at greater risk than their roadside counterparts in rural and remote areas.

Perhaps not surprisingly, a large majority of RRRSS cases (82%) involve male patients, while a smaller yet substantial majority (69%) of males comprise the roadside group. The findings presented above are consistent with the considerable literature on driving, risk and gender, wherein the most dominant feature of high-risk groups is arguably a predominance of males. However, gender-specific policing and enforcement interventions are seemingly both unlikely and undesirable, while there is scope for only limited success with current formal strategies in rural and remote areas. The common behaviour-related themes of alcohol, speed and seatbelt/helmet use emerge as particular concerns in the RRRSS, as in other studies which address inherent limitations of formal sanctions and controls (Freeman et al., 2005, Schell et al., 2006). Thus behavioural and social change advocacy appears among the best of long term strategies, for which health, transport, policing and public priorities must find more common and productive ground for successful intervention development.

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